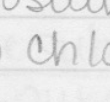
Matter - Unit 1

Molecule - a discrete, electrically neutral particle made of smaller particles, atoms, that are bonded together

Compound - a substance that can be separated into simpler substances only by a chemical change

Element - a pure substance that can't be broken down into other substances by chemical or physical means

Molecular compounds - compounds that consist of molecu
ex: H_2O molecules 

Ionic compounds - compounds made up of ions, atoms that have a positive or negative charge
ex: Sodium chloride - NaCl 

Matter - anything that has mass and takes up space

Thermal Energy - the total energy of all of the particles in an object

Physical Change - a change that alters the form or appearance of matter but doesn't make any substanc in the matter into a different substance
ex: powder dissolving in a glass of liquid is undergoing a physical change

Endothermic Change - a change in which energy is taken in.
ex: an iceberg melting as it absorbs thermal energy around it.

Chemical Property - a characteristic of a pure substance that describes its ability to change into different substances
ex: the chemical property in burning wood turns it from wood to ash

All things/you are "matter"

Properties of Matter
- Chemistry is the study of the properties of matter & how matter changes.
- A substance is a single kind of matter that is pure, meaning it always has a specific make-up, or composition, & a specific set of properties

Pure substance ex: salt, sugar, baking soda
Not-pure substances ex: milk, flour, butter

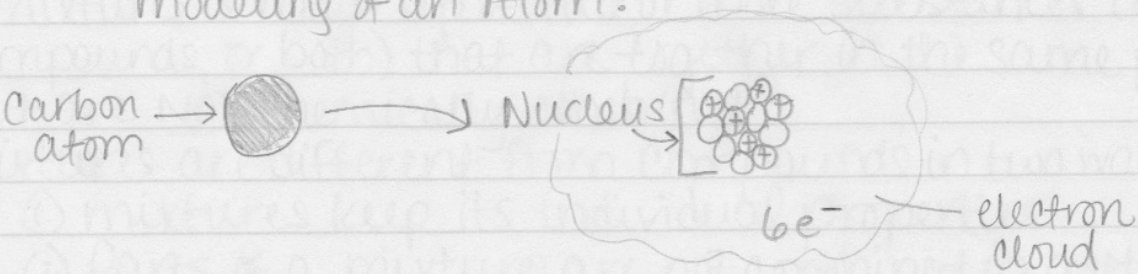
- Every form of matter has two kinds of properties - physical & chemical properties
Ex: Oxygen → physical ⇒ gas @ room temp.
→ chemical ⇒ reacts c̄ iron to form rust

Physical Properties	VS.	Chemical Properties
• a pure substance that can be observed w/o Δing it into another substance Ex: H_2O freezes @ 0°C becoming solid ice		• a pure substance that describes its ability to Δ into different subst Ex: methane (natural gas) can catch fire & burn. When it burns, it combines c̄ O_2 & forms new substances ⇒ H_2O & CO_2
• hardness, texture, color, mass		• Burning, flamability, ability to react
• solid, liquid, gas		• to observe a chemical property, you must try to Δ the substance into another substance
• does it dissolve in H_2O or not		
• luster, conduct heat, magnetic, flexible, pressed, breakable		

Elements:

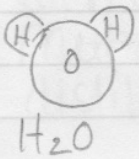
- all matter in the universe is made up of more than 100 different substances, called elements
- Element - a pure substance that cannot be broken down into any other substances by chemical or physical means
  - * these are the simplest substances
  - * each element can be identified by its specific physical and chemical properties
  - * Represented by a one or two-letter symbol ex. O = Oxygen
- Particles of Elements → Atoms
  - * An atom is the basic particle from which all elements are made
  - * Different elements have different properties b/c their atoms are different

Modeling of an Atom:



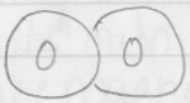
- * When atoms combine w/ other atoms they form a chemical bond, which is the force of attraction between the 2 atoms
- * Molecules - atoms combining to form larger particles; groups of 2 or more atoms held together by chemical bonds

Water Molecule



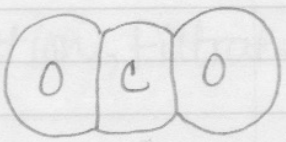
H_2O

Oxygen Molecule



O_2

Carbon dioxide molecule



CO_2

Compounds:

- A compound is a pure substance made up of two or more elements chemically combined in a set ratio; represented by a chemical formula which shows the elements in the compound and the ratio of atoms
  - Ex: Carbon dioxide ⇒ CO_2 ⇒ Ratio of carbon to oxygen is 1:2
  - Ex: Carbon monoxide ⇒ CO ⇒ Ratio 1:1
- When elements are chemically combined, they form compounds having properties that are different from those of the uncombined elements
  - * the chemical formula shows you the elements in the compound & the ratio of atoms

Mixtures:

- A mixture is made up of two or more substances (elements, compounds, or both) that are together in the same place but are NOT chemically combined
- Mixtures are different from compounds in two ways:
  1. Mixtures keep its individual properties
  2. Parts of a mixture are not combined in a set ratio
- Heterogeneous mixture - you can see the different parts
  - Ex: a salad (lettuce, tomatoes, cheese, etc)
- Homogeneous mixture - so evenly mixed that you can't see the different parts; Ex: Sugar dissolved in H_2O
  - * A homogeneous mixture is called a solution, and can be a solid, liquid, or gas

Note: Compounds can be difficult to separate into its elements mixtures can be more easily separated into its components b/c each component keeps its own properties

- * Methods of separation: magnetic attraction, filtration, distillation, & evaporation